

PATENT ABSTRACTS OF JAPAN

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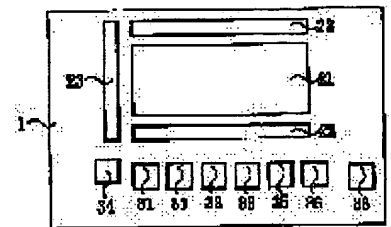
(72)Inventor : OGAWA HIROSHI

(54) LCD DEVICE OF TYPE INTEGRATED WITH CPU AND ITS PRODUCTION

(57)Abstract:

PURPOSE: To provide an LCD device of a type integrated with a CPU by using a non-alkaline glass substrate.

CONSTITUTION: This LCD device is composed of an LCD circuit which is formed with a TFT array 21 by using polycrystalline silicon as well as drivers for driving TFTs having a TFT source driver 22 and a TFT gate driver 23 on the non-alkaline glass substrate 1 and a CPU circuit which is formed with a bare chip of a CPU 31, RAM 32, ROM 32 and gate array 34 and a bare chip of a resistor 35, capacitor 36, oscillator 37 and connector 38 respectively on the non-alkaline glass substrate 1.



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CLAIMS

[Claim(s)]

[Claim 1] CPU one apparatus LCD equipment characterized by having consisted of a LCD circuit which used polycrystal silicon and formed the TFT array and the driver for a TFT drive on the alkali-free-glass substrate, and a CPU circuit which formed respectively the bare chip of CPU, RAM, ROM, and a gate array and resistance, a capacitor, VCO, and the bare chip of a connector on the above-mentioned alkali-free-glass substrate, and performing each wiring for connection between this CPU circuit and the above-mentioned LCD circuit.

[Claim 2] On an alkali-free-glass substrate, use polycrystal silicon and a LCD circuit is formed by the TFT array and the driver for a TFT drive. And conductive adhesion of the CPU circuit formed with the bare chip of CPU, RAM, ROM, and a gate array and resistance, a capacitor, VCO, and the bare chip of a connector is carried out on the above-mentioned alkali-free-glass substrate. the manufacture method of the CPU one apparatus LCD equipment which makes wiring connection of between the above-mentioned LCD circuit and a CPU circuit by the each spatter, and is characterized by giving wirebonding to the above-mentioned bare chip of each, and performing resin coating

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the LCD equipment which used TFT of a polycrystal silicon thin film, and relates to the LCD equipment which really formed the CPU circuit and the LCD circuit on the alkali-free-glass substrate especially.

[0002]

[Description of the Prior Art] As shown in drawing 3, conventional LCD equipment on the quartz substrate 101 which has the heatproof of 1200 degrees C The drain and source circuit pattern of TFT, A power supply and the metal layer 102 of a ground circuit pattern are formed by the spatter (amorphous thin film creation). The polycrystal silicon layer 3 used as the source and a drain field is made to form by CVD (Chemical VaporDeposition:chemical-vapor-deposition method). Pour in boron and the impurity of Lynn, form P+ layer and n+ layer, and the polycrystal silicon layer 4 used as a barrier layer is formed by CVD on this P+ layer and n+ layer. laser annealing processing (recrystallization processing) -- carrying out -- the SiO two-layer of a gate insulator layer -- while forming 5, the metal layer 6 of a gate electrode is formed

[0003] Then, the quartz substrate 117 which formed the light filter 15 through the ITO film 16 of an opposite side, and the above-mentioned quartz substrate 101 were made to rival, LCD14 was poured in, the deviation films 13 and 18 were stretched to the quartz substrate 101,117, and the TFT array and the driver for a TFT drive were formed with polycrystal silicon.

[0004]

[Problem(s) to be Solved by the Invention] Conventional LCD equipment formed the TFT array and the driver for a TFT drive with polycrystal silicon.

[0005] Then, the purpose of this invention is to offer the CPU one apparatus LCD equipment which carried the LCD circuit and the CPU circuit on the alkali-free-glass substrate, and its manufacture method.

[0006]

[Means for Solving the Problem] In order to solve an above-mentioned technical problem, the CPU one apparatus LCD equipment of this invention The LCD circuit which used polycrystal silicon and formed the TFT array and the driver for a TFT drive on the alkali-free-glass substrate, the above-mentioned alkali-free-glass substrate top -- the bare chip of CPU, RAM, ROM, and a gate array -- and It consists of CPU circuits which formed resistance, a capacitor, VCO, and the bare chip of a connector respectively, and is characterized by performing each wiring for connection between this CPU circuit and the above-mentioned LCD circuit.

[0007] In order to solve an above-mentioned technical problem, the manufacture method of the CPU one apparatus LCD equipment of this invention On an alkali-free-glass substrate, use polycrystal silicon and a LCD circuit is formed by the TFT array and the driver for a TFT drive. And conductive adhesion of the CPU circuit formed with the bare chip of CPU, RAM, ROM, and a gate array and resistance, a capacitor, VCO, and the bare chip of a connector is carried out on the above-mentioned alkali-free-glass substrate. wiring connection of between the above-mentioned LCD circuit and a CPU circuit is made by the each spatter, and it is characterized by giving wirebonding to the above-mentioned bare chip of each, and performing resin coating

[0008]

[Example] Next, the CPU one apparatus LCD equipment by one example of this invention is explained with reference to a drawing.

[0009] Drawing 1 is the plan showing the CPU one apparatus LCD equipment by one example of this invention.

[0010] Drawing 2 is the cross section showing the CPU one apparatus LCD equipment by one example of this invention.

[0011] The CPU one apparatus LCD equipment by one example of this invention The LCD circuit in which the driver for a TFT drive which uses polycrystal silicon on the alkali-free-glass substrate 1, and has the TFT array 21 and the TFT source driver 22, and the TFT gate driver 23 as shown in drawing 1 was formed, It consists of CPU circuits which formed respectively the bare chip of CPU31, RAM32, ROM32, and a gate array 34 and resistance 35, a capacitor 36, VCO 37, and the bare chip of a connector 38 on the alkali-free-glass substrate 1.

[0012] Next, the manufacture method of the CPU one apparatus LCD equipment by one example of this invention is explained with reference to a drawing.

[0013] Next, the manufacture method of the CPU one apparatus LCD equipment by one example of this invention As shown in drawing 1 and drawing 2 , the aluminum layer 2 used as the direction connection circuit pattern of Y of the drain of the TFT array 21, source wiring, and a CPU circuit is formed by the spatter on the alkali-free-glass substrate 1 whose heat-resistant temperature is 600 degrees C. the polycrystal silicon layer 3 used as the source and a drain field -- the LPCVD method (the crystal silicon film into which gas was made to decompose under about 600 degrees C and reduced pressure (vacuum) of about dozens of mTorr is grown up. Low Pressure Chemical Vapor Deposition: --) the SiO two-layer which pours in formation, boron, and the impurity ion of Lynn, builds P+ layer and n+ layer, forms the polycrystal silicon layer 4 used as a barrier layer by the LPCVD method on this P+ layer and n+ layer, performs laser annealing processing, attains activation, and serves as a gate insulator layer -- 5 is formed

[0014] Therefore, the bare chip of the aluminum layer 6 of a gate electrode, the direction aluminum wiring 7 of Y and CPU31, RAM32 and ROM32, and a gate array 34, the pad 8 for QFP(QuadFlat Package) IC loading and the pad 9 for lead connection, and resistance 35, a capacitor 36, VCO 37 and the pad 8 for bare chip loading of a connector 38 are formed.

[0015] Furthermore, a light filter 15 is formed in the alkali-free-glass substrate 17 of an opposite side through the ITO layer 16. Make the above-mentioned alkali-free-glass substrate 1 rival, and LCD14 is pressed fit. A bare chip 11 or QFP, resistance 35, a capacitor 36, VCO 37, and a connector 38 are made to fix by the electroconductive glue. A bare chip 11 performs bonding with the aluminum wire 10, coats it with a resin 12, and sticks the deviation films 13 and 18 on the alkali-free-glass substrates 1 and 17.

[0016]

[Effect of the Invention] Since a LCD circuit and a CPU circuit can be carried using a cheap alkali-free-glass substrate according to the CPU one apparatus LCD equipment by one example and its manufacture method of this invention as explained above, it is effective in thin and cheap equipment being realizable.

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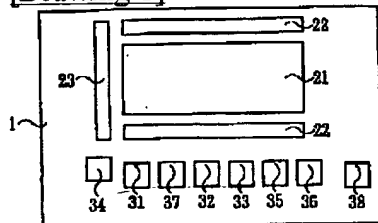
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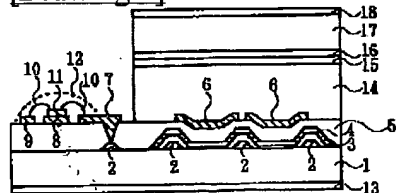
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DRAWINGS

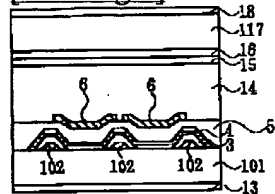
[Drawing 1]



[Drawing 2]



[Drawing 3]



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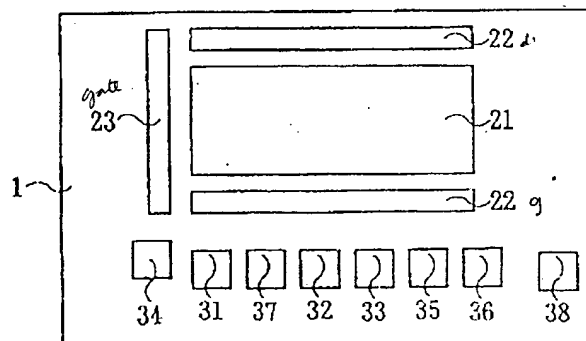
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内

(54) 【発明の名称】 CPU一体型LCD装置及びその製造方法

(57) 【要約】

【目的】 無アルカリガラス基板を使用してCPU一体型LCD装置を提供。

【構成】 無アルカリガラス基板1上に多結晶シリコンを用いてTFTアレイ21及びTFTソースドライバ22、TFTゲートドライバ23を有するTFT駆動用ドライバを形成したLCD回路と、無アルカリガラス基板1上にCPU31、RAM32、ROM32、ゲートアレイ34のペアチップ及び、抵抗35、コンデンサ36、発振器37、コネクタ38のペアチップを各々形成したCPU回路とで構成される。



【特許請求の範囲】

【請求項 1】 無アルカリガラス基板上に多結晶シリコンを用いて TFT アレイ及び TFT 駆動用ドライバを形成した LCD 回路と、上記無アルカリガラス基板上に CPU、RAM、ROM、ゲートアレイのベアチップ及び、抵抗、コンデンサ、発振器、コネクタのベアチップを各々形成した CPU 回路とで構成され、この CPU 回路及び上記 LCD 回路間に各々の接続用配線を施したことを特徴とする CPU 一体型 LCD 装置。

【請求項 2】 無アルカリガラス基板上に多結晶シリコンを用いて TFT アレイ及び TFT 駆動用ドライバで LCD 回路を形成し、かつ CPU、RAM、ROM、ゲートアレイのベアチップ及び、抵抗、コンデンサ、発振器、コネクタのベアチップで形成された CPU 回路を上記無アルカリガラス基板上に導電性接着させ、上記 LCD 回路及び CPU 回路間を各々スパッタ法で配線接続し、上記各々ベアチップにワイヤー・ボンディングを施して樹脂コーティングを行なうことを特徴とする CPU 一体型 LCD 装置の製造方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、多結晶シリコン薄膜の TFT を用いた LCD 装置に係り、特に、CPU 回路と LCD 回路とを無アルカリガラス基板上に一体形成した LCD 装置に関する。

【0002】

【従来の技術】従来の LCD 装置は、図 3 に示すように、1200℃の耐熱を有する石英基板 101 上に TFT のドレイン及びソース配線パターン、電源及びアース配線パターンの金属層 102 をスパッタ法（非晶質薄膜作成）で形成し、ソース及びドレイン領域となる多結晶シリコン層 3 を CVD（Chemical Vapor Deposition：化学気相成長法）で形成させ、ボロン及びリンの不純物を注入して P+ 層、n+ 層を形成し、この P+ 層、n+ 層上に活性層となる多結晶シリコン層 4 を CVD 法で形成し、レーザアニール処理（再結晶処理）を行なってゲート絶縁膜の SiO₂ 層 5 を形成するとともにゲート電極の金属層 6 を形成する。

【0003】その後、反対面の ITO 膜 16 を介してカラーフィルタ 15 を形成した石英基板 117 と上述の石英基板 101 とを張り合わせて LCD 14 を注入し、偏光膜 13、18 を石英基板 101、117 に張り、TFT アレイ及び TFT 駆動用ドライバを多結晶シリコンで形成するに過ぎなかった。

【0004】

【発明が解決しようとする課題】従来の LCD 装置は、TFT アレイ及び TFT 駆動用ドライバを多結晶シリコンで形成するに過ぎなかった。

【0005】そこで、本発明の目的は、LCD 回路と CPU

体型 LCD 装置及びその製造方法を提供することにある。

【0006】

【課題を解決するための手段】上述の課題を解決するために、本発明の CPU 一体型 LCD 装置は、無アルカリガラス基板上に多結晶シリコンを用いて TFT アレイ及び TFT 駆動用ドライバを形成した LCD 回路と、上記無アルカリガラス基板上に CPU、RAM、ROM、ゲートアレイのベアチップ及び、抵抗、コンデンサ、発振器、コネクタのベアチップを各々形成した CPU 回路とで構成され、この CPU 回路及び上記 LCD 回路間に各々の接続用配線を施したことを特徴とする。

【0007】上述の課題を解決するために、本発明の CPU 一体型 LCD 装置の製造方法は、無アルカリガラス基板上に多結晶シリコンを用いて TFT アレイ及び TFT 駆動用ドライバで LCD 回路を形成し、かつ CPU、RAM、ROM、ゲートアレイのベアチップ及び、抵抗、コンデンサ、発振器、コネクタのベアチップで形成された CPU 回路を上記無アルカリガラス基板上に導電性接着させ、上記 LCD 回路及び CPU 回路間を各々スパッタ法で配線接続し、上記各々ベアチップにワイヤー・ボンディングを施して樹脂コーティングを行なうことを特徴とする。

【0008】

【実施例】次に、本発明の一実施例による CPU 一体型 LCD 装置を、図面を参照して説明する。

【0009】図 1 は、本発明の一実施例による CPU 一体型 LCD 装置を示す平面図である。

【0010】図 2 は、本発明の一実施例による CPU 一体型 LCD 装置を示す断面図である。

【0011】本発明の一実施例による CPU 一体型 LCD 装置は、図 1 に示すように、無アルカリガラス基板 1 上に多結晶シリコンを用いて TFT アレイ 21 及び TFT ソースドライバ 22、TFT ゲートドライバ 23 を有する TFT 駆動用ドライバを形成した LCD 回路と、無アルカリガラス基板 1 上に CPU 31、RAM 32、ROM 32、ゲートアレイ 34 のベアチップ及び、抵抗 35、コンデンサ 36、発振器 37、コネクタ 38 のベアチップを各々形成した CPU 回路とで構成される。

【0012】次に、本発明の一実施例による CPU 一体型 LCD 装置の製造方法を、図面を参照して説明する。

【0013】次に、本発明の一実施例による CPU 一体型 LCD 装置の製造方法は、図 1 及び図 2 に示すように、耐熱温度が 600℃の無アルカリガラス基板 1 上に TFT アレイ 21 のドレイン及びソース配線及び CPU 回路の Y 方向接続配線パターンとなるアルミ層 2 をスパッタ法で形成し、ソース及びドレイン領域となる多結晶シリコン層 3 を LPCVD 法（Low Pressure Chemical Vapor Deposition）で形成する。

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でガスを分解させて結晶シリコン膜を成長させる。)で形成、ボロン及びリンの不純物イオンを注入して、P+層、n+層を造り、このP+層、n+層上に活性層となる多結晶シリコン層4をLPCVD法で形成してレーザーアニール処理を行い、活性化を図ってゲート絶縁膜となるSiO₂層5を形成する。

【0014】従って、ゲート電極のアルミ層6、Y方向アルミ配線7及び、CPU31、RAM32、ROM32、ゲートアレイ34のベアチップと、QFP (Quad Flat Package) IC搭載用のパッド8及び、リード接続用のパッド9と、抵抗35、コンデンサ36、発振器37、コネクタ38のベアチップ搭載用のパッド8を形成する。

【0015】さらに、反対面の無アルカリガラス基板17にITO層16を介してカラーフィルタ15を形成し、上述の無アルカリガラス基板1とを張り合わせてLCD14を圧入し、ベアチップ11あるいはQFP、抵抗35、コンデンサ36、発振器37、コネクタ38を導電性接着剤で固定させ、ベアチップ11はアルミワイヤ10でボンディングを行なって樹脂12でコーティングし、偏向膜13、18を無アルカリガラス基板1、17に張り付ける。

【0016】

【発明の効果】以上説明したように、本発明の一実施例

によるCPU一体型LCD装置及びその製造方法によれば、安価な無アルカリガラス基板を用いてLCD回路及びCPU回路を搭載できるため、薄くて安価な装置を実現できる効果がある。

【図面の簡単な説明】

【図1】本発明の一実施例によるCPU一体型LCD装置を示す平面図である。

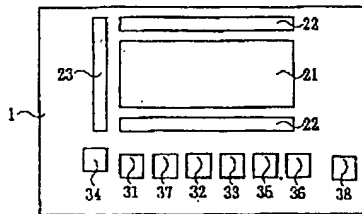
【図2】本発明の一実施例によるCPU一体型LCD装置を示す断面図である。

【図3】従来のLCD装置を示す断面図である。

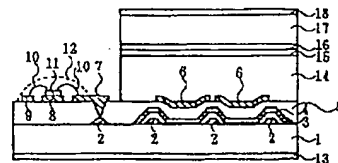
【符号の説明】

- 1、17 無アルカリガラス基板
- 2、6 LCD回路 (アルミ層)
- 3、4 多結晶シリコン層
- 5 多結晶シリコン層 (SiO₂層)
- 7 接続用配線 (Y方向アルミ配線)
- 8、9 接続用配線 (パッド)
- 10 接続用配線 (アルミワイヤ)
- 11 ベアチップ
- 12 樹脂
- 13、18 LCD回路 (偏向膜)
- 14 LCD回路 (LCD)
- 15 LCD回路 (カラーフィルタ)
- 16 LCD回路 (ITO膜)

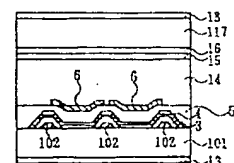
【図1】



【図2】



【図3】



- 31
- 32
- 33
- 34
- 35 impedance
- 36
- 37
- 38

MENU

SEARCH

INDEX

DETAIL

1/1



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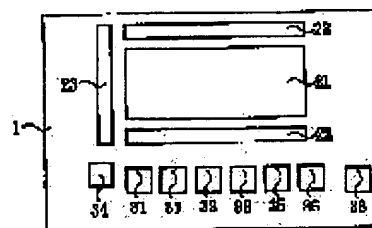
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CLAIMS

[Claim(s)]

[Claim 1] CPU one apparatus LCD equipment characterized by consisting of a LCD circuit which used polycrystal silicon and formed TFT array and the driver for TFT drive on the alkali-free-glass substrate, and a CPU circuit which formed respectively the bare chip of the bare chip of CPU, RAM, ROM, and a gate array and resistance, a capacitor, VCO, and a connector on the above-mentioned alkali-free-glass substrate, and performing each wiring for connection between this CPU circuit and the above-mentioned LCD circuit.

[Claim 2] On an alkali-free-glass substrate, use polycrystal silicon and LCD circuit is formed by TFT array and the driver for TFT drive. And conductive adhesion of the bare chip of CPU, RAM, ROM, and a gate array and resistance, a capacitor, VCO, and the CPU circuit formed by the bare chip of a connector is carried out on the above-mentioned alkali-free-glass substrate. the manufacture technique of the CPU one apparatus LCD equipment which makes wiring connection of between the above-mentioned LCD circuit and CPU circuit by the each spatter, and is characterized by giving wire bonding to the above-mentioned bare chip of each, and performing resin coating

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